

CLAIMS

1. Aqueous polyorganosiloxane (POS) emulsion, crosslinkable to an elastomer by means of polyaddition reactions, for impregnating woven or non-woven fibrous substrates, said emulsion comprising:
- (A) at least one POS having at least two unsaturated functional groups of the C₂-C₆ alkenyl type bonded to the silicon in each molecule,
 - (B) at least one POS having at least three hydrogen atoms bonded to the silicon in each molecule,
 - (C) at least one special adhesion promoter,
 - (D) at least one catalyst,
 - (E) at least one surfactant,
 - (F) optionally at least one POS resin containing at least two alkenyl groups,
 - (G) optionally at least one crosslinking inhibitor,
 - (H) optionally at least one pH fixing agent,
 - (I) optionally at least one formulating additive,
 - (J) optionally a filler,
 - (K) and water,
- characterized in that:
- the adhesion promoter (C) is selected from the group of compounds comprising protective hydrocolloids, hydroxylated silanes and/or POS carrying at least one hydroxyl group and at least one salified amino group per molecule, and mixtures thereof,
 - the percentage by weight of the adhesion promoter (C), based on the silicone phase, is such that:

$0.005 \leq (C) \leq 10$
preferably $0.03 \leq (C) < 5$
and particularly preferably $0.05 \leq (C) \leq 4.0$
 - with the proviso that, when the emulsion comprises at least one protective hydrocolloid, it is obtained by:
 - * directly preparing at least one pre-emulsion that is non-catalyzing, i.e. devoid of catalyst (D), and at least one pre-emulsion that is catalyzing, i.e. contains catalyst (D), at least one of these pre-

emulsions being obtained by bringing at least part of the silicone phase and at least part of the protective hydrocolloid into contact with water,

- 5 * and then mixing the catalyzing emulsion(s) with the non-catalyzing pre-emulsion(s) when the impregnating bath is made up.

2. Emulsion according to claim 1, characterized in that it is devoid of:

- 10 * substantially linear, vinylated polydiorganosiloxane copolymer(s) of the random type, blocked at each end of its polymer chain by vinyl-diorganosiloxy or triorganosiloxy groups and containing at least three SiVi groups per molecule,
- 15 * and/or vinylated cyclotrisiloxane(s) of the formula $[R(CH_2=CH)SiO]_3$, in which R is a C₁-C₄ alkyl radical, a phenyl radical or a 3,3,3-trifluoropropyl radical, this vinylated cyclotrisiloxane being present in an amount such that 0.5 to 60% and preferably 1.5 to 20% of the number of vinyl groups in the emulsion consist of the vinyls of this vinylated cyclotrisiloxane,
- * and/or sodium laurylsulfate.

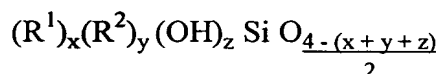
20 3. Emulsion according to claim 1, characterized in that the ratio of the amount by weight of adhesion promoter (C) to the surface area developed by the substrate ranges from 0.1 to 10 mg/m² and preferably from 0.2 to 5 mg/m².

25 4. Emulsion according to claim 1 or 2, characterized in that the adhesion promoter (C) consists of a polyvinyl alcohol (PVA).

 5. Emulsion according to any one of claims 1 to 4, characterized in that the surfactant (E) consists at least in part of PVA.

30 6. Emulsion according to any one of claims 1 to 5, characterized in that the PVA is used in the form of an aqueous solution having a standard dynamic viscosity (η_{sd}) of between 5 and 40 mPa.s and preferably of between 10 and 30 mPa.s, and an ester number greater than or equal to 80, preferably greater than or equal to 100 and especially of between 120 and 200.

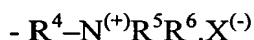
7. Emulsion according to any one of claims 1 to 6, characterized in that the salified amino-POS constituting the promoter (C) is formed of several repeat units of average formula (I) below:



(I)

in which:

- R^1 is a monovalent group devoid of nitrogen whose nature is identical or different from one repeat unit to the next and which is a C_1 - C_6 alkyl, an aryl, a C_2 - C_8 alkenyl or an acrylate, each of these groups optionally being substituted;
- R^2 is of an identical or different nature from one repeat unit to the next and has the following formula:



- * R^4 being an optionally substituted C_1 - C_{10} hydrocarbon radical,
- * the groups R^5 and R^6 being identical or different and representing hydrogen, an optionally substituted C_1 - C_{10} hydrocarbon radical or $-R^4-NH_3^{(+)}X^{(-)}$,
- * or the groups R^5 and R^6 being different from hydrogen and together forming a 5- to 7-membered ring containing at least one heteroatom, preferably nitrogen or oxygen,
- * and X being a counteranion selected from carboxylates and halides;
- x, y and z are positive integers or decimal numbers below 4;
- and $x + y + z < 4$.

8. Emulsion according to the preceding claim, characterized in that the salified amino-POS is a resin having a mean silicon functionality greater than 2, corresponding to $x + y < 2$:

- x preferably being < 2 and, particularly preferably, $0.1 \leq x \leq 1$;
- y preferably being < 1.2 and, particularly preferably, $0.1 \leq y \leq 1.1$.

9. Emulsion according to any one of claims 1 to 8, characterized in that it comprises:

- ◆ 100 parts by weight of an α,ω -divinylated POS oil (A) with a vinyl group content of between 2 and 100 meq/100 g;
- 5 ◆ 0 to 150 parts by weight of a dispersion of a reinforcing, semireinforcing and/or bulking filler (J) in water or in an α,ω -divinylated POS oil (in an amount of 10 to 60% of filler in the dispersion);
- 10 ◆ 1 to 7 parts by weight of at least one POS oil (B1) containing $\equiv\text{SiH}$ such that the ratio of the number of Si-H groups to the number of Si-alkenyl groups ranges from 0.4 to 10 and preferably from 0.6 to 5;
- ◆ 0.2 to 5 parts by weight of an adhesion promoter (C), taken in the dry state;
- 15 ◆ a polyaddition catalyst (D) composed of at least one metal belonging to the platinum group, in an amount of 2 to 150 ppm of platinum;
- ◆ 0.5 to 10 parts by weight of a surfactant (E);
- ◆ 0 to 100 parts by weight of a POS resin (F);
- ◆ 0 to 1 part by weight of a crosslinking inhibitor (G);
- 20 ◆ 0 to n parts by weight of a pH fixing agent (H), n being such that the pH is maintained between 7 and 8;
- ◆ 0 to m parts by weight of a formulating additive (I);
- ◆ 0 to 150 parts by weight of a dispersion of a reinforcing, semireinforcing and/or bulking filler (J) in an α,ω -divinylated POS oil, in an amount of 10 to 80% of filler in the dispersion;
- 25 ◆ 40 to 2000 parts by weight of water (K) so that the final emulsion or the bath (produced by mixing several emulsions with water) used to treat the fabric has a dry extract of between 5 and 65%.

10. Process for the preparation of an aqueous POS emulsion according to any one of claims 1 to 9, characterized in that an emulsion is formed by introducing the constituents (A) to (K) into the same reactor, except for the catalyst (D), which is emulsified separately and added when the impregnating bath is made up.

11. Process according to the preceding claim, characterized in that the aqueous

POS emulsion is obtained by:

- * directly preparing at least one pre-emulsion that is non-catalyzing, i.e. devoid of catalyst (D), and at least one pre-emulsion that is catalyzing, i.e. contains catalyst (D), at least one of these pre-emulsions being
5 obtained by bringing at least part of the silicone phase and at least part of the protective hydrocolloid into contact with water,
- * and then mixing the catalyzing emulsion(s) with the non-catalyzing pre-emulsion(s) when the impregnating bath is made up.

10 12. Process according to claim 10 or 11, characterized in that:

- the following pre-emulsions are produced:
 - (i) a pre-emulsion as the basis of the POS (A),
 - (ii) a pre-emulsion as the basis of the POS (B) (crosslinking
emulsion),
 - 15 (iii) a pre-emulsion as the basis of the catalyst (D) (catalyzing
emulsion), consisting e.g. of an aqueous emulsion of a type g
platinum catalyst prediluted in a vinylated silicone oil;
- these pre-emulsions are mixed, it being possible for one or other of the
pre-emulsions (i) to (iii) also to contain the surfactant (E), optionally the
20 POS resin (F), optionally the crosslinking inhibitor (G) and/or
optionally the pH fixing agent (H) and/or optionally the formulating
additive (I), the catalyzing emulsion preferably being added when the
coating bath is formulated.

25 13. Process according to one of the preceding claims, characterized in that:

- when the surfactant (E) is used as the only emulsifier, the emulsion is
formed directly or by phase inversion;
- when (all or part of) a PVA (C) is used as the only emulsifier, the
emulsion is only formed directly,
- 30 direct emulsification consisting in pouring the silicone phase into the aqueous
solution containing the surfactant.

14. Process according to one of the preceding claims, characterized in that the
adhesion promoter (C) is introduced only when the coating bath is prepared.

15. Use of an emulsion according to one of claims 1 to 9, or obtained by the process according to one of claims 10 to 14, for coating a fibrous substrate, except for any architectural textile.